



## Synergistic Systems Module Overview

### **Alternative Energy**

In the *Alternative Energy* Module, students explore the basic concepts of energy, as well as the Law of Conservation of Energy. Information is presented about renewable and nonrenewable energy sources and how these resource types are important for meeting global energy demands. The advantages and disadvantages of alternative energy forms such as solar, wind, biomass, geothermal, and hydropower are presented. Hands-on experiences include experiments with a wind turbine, solar cells, hydrogen fuel cells and building a model solar electric car.

### **Animals**

In the *Animals* Module, students learn classification systems and the place of animals (including humans) within them. They explore physical and life-style characteristics of invertebrates and vertebrates through hands-on activities. They compare organisms in terms of adaptations such as symmetry, movement, and organ systems. They explore the transition to land and temperature regulation. They are introduced to concepts of evolution and the fossil record.

### **Applied Physics**

In the *Applied Physics* Module, students learn about the forces of nature they must control and learn to live with to make their lives more enjoyable. Using an air track, students learn the laws of inertia, study energy transfer, and calculate the velocity of air track cars by using a photogate timer. Students study data transmission using a laser. They also learn about radio waves, light, and heat and do experiments relating to mathematics.

### **Aquaculture**

In the *Aquaculture* Module, students learn fish biology, care, and management by maintaining their own goldfish tank. After an introduction to the history of aquaculture, they conduct chemical tests of tank water, learn fish anatomy and metabolism, calculate fish growth and productivity, and maintain records of their activities. Along the way, they learn the processes involved in an aquaculture operation and consider environmental impacts of aquaculture.

### **Astronomy**

In the *Astronomy* Module, students learn about the vastness of outer space and their relationship to it. They investigate the Sun-Moon-Earth system, the solar system, and the larger universe, including stars, galaxies, black holes, and supernovas. Students learn basic characteristics of the optical telescope and practice focusing on distant objects. Also, they learn methods for expressing the vast distances in space in mathematical terms.

### **Audio Broadcasting**

In the *Audio Broadcasting* Module, students experience the important medium of radio and produce a radio broadcast. Students learn how to use a digital audio editing software program, record several announcements and stories, and assemble the recorded pieces into a sample broadcast. Students also learn about radio waves and how sound is sent from the station to people's radios in their homes and automobiles miles away.

### **Baking & Measurement**

In the *Baking & Measurement* Module, students use recipes to prepare several foods. This food preparation includes measuring, mixing, cooking, and serving the food. Students use computer software to evaluate and plan nutritious meals. They explore many of the foods they enjoy eating to determine which nutrients those foods contain and which ones are the healthiest.

### **Basic Sewing**

In the *Basic Sewing* Module, students learn the basics of sewing and operating a sewing machine while constructing a loot bag. They use their computer to design a fabric pattern and a monogram. In addition to the basics, students learn slightly more advanced sewing procedures, such as installing a zipper.

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### **BioEngineering**

In the *BioEngineering* Module, students explore topics related to kinesiology and sports performance. They measure the body angles and range of motion (ROM) of selected joints to explore the mathematics behind projectile motion. Students cover mathematical concepts including angles, positive and negative rational numbers, data collection, and simple algebra. Then, they perform flexibility tests, take digital images of the tests, and use the computer to analyze student flexibility.

### **Biotechnology**

In the *Biotechnology* Module, students briefly explore the past, present, and future of biotechnology. Through hands-on activities, computer simulations, and laboratory experiments, they investigate the structure of the DNA molecule and learn how it can be changed through genetic engineering, including recombinant DNA, gene splicing, and transgenic biotechnology. They consider some implications of using biotechnology in medicine, agriculture, and other fields.

### **Body Systems**

In the *Body Systems* Module, students explore the structure and functions of the 11 body systems. They measure functions and characteristics of their own bodies, including respiration rate, CO<sub>2</sub> production, binocular vision, length of the digestive tract, and pulse rate. Students learn the hierarchy of organization within their own bodies and how body systems work together to maintain homeostasis. Students complete the module with a review of the 11 systems.

### **Breakfast Nutrition**

In the *Breakfast Nutrition* Module, students use a computer program to calculate the nutritional value of cereal and various other breakfast dishes. They prepare several nutritious breakfast foods. Students also apply various measuring techniques. They learn about fast food, kitchen cleanup, and explore the benefits of eating natural versus processed foods.

### **CADD**

In the *CADD* Module, students use computer-aided drafting (CAD) software to explore the fundamentals of drafting. They use CAD software to create multiview drawings of a geometric solid and complete a set of floor plans. The floor plans are based on standards for architectural drawings, and the students implement 3-D software to create a computer “walk-through” of their floor plans.

### **Careers**

In the *Careers* Module, students explore careers through the use of the *Occupational Outlook Handbook* and a computer program. As they work through the various activities, they begin to build a portfolio of information that is relevant to the specific careers that interest them. Students gain insight into the many opportunities that await them when they enter the world of work.

### **Cell Structure**

In the *Cell Structure* Module, students discover the structure and function of the living cell by doing a variety of hands-on activities. They learn proper techniques of microscope use. They observe prepared slides of cells and tissues, make wet-mount slides of living cells, and compare plant and animal cells. They do a naked-egg experiment to demonstrate osmosis across a semipermeable membrane. They use cell models to identify plant and animal cell organelles.

### **Climates & Biomes**

In the *Climate & Biomes* Module, students learn what climate is, what processes drive it, and how we measure both past and present climates. They locate and describe Earth’s major biomes (large ecological systems), relate biomes to climatic zones, and demonstrate concepts such as the greenhouse effect, albedo, and global warming. The Module enables students to practice higher level scientific thinking, such as use of models, recognizing types of evidence, and developing informed opinions.

### **Clothing Care**

In the *Clothing Care* Module, students test water to determine what kind of detergent they should use in their particular geographical location. They learn the proper procedures for washing, drying, and ironing clothes and how these procedures are affected by the care labels on clothes. Students also conduct a test to determine which laundry detergent and spot remover work the best. They also learn how to reattach buttons and fasteners that can come off clothing while doing the laundry.

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### **CNC Lathe**

In the *CNC Lathe* Module, students learn about the concepts of computers controlling a machine; while using a lathe as the example. Students use a VR/CAD program to design and communicate with the lathe to machine stock into a functional object. Practical applications of this technology are also incorporated into the content.

### **CNC Manufacturing**

In the *CNC Manufacturing* Module, students explore the manufacturing process and important inventions that have advanced these various processes. Students learn the relationship of software to manufacturing and use software to design a project that is later machined on the Z Mill. The Cartesian coordinate system and its effects on machine movement and digital automation are also presented.

### **CNC Mill**

In the *CNC Mill* Module, students are introduced to CNC manufacturing by using a CNC Micromill, a fully functional tabletop mill. They learn to design products using the Cartesian coordinate system, to program the computer to manufacture their designs, to use a virtual reality program to preview the product in three dimensions, and to use the mill to manufacture the finished product. Students are also introduced to mass production and the importance of quality control.

### **Computer Graphics & Animation**

In the *Computer Graphics & Animation* Module, students learn how the use of computers can enhance the products created by professional artists and animators. With the use of a computer and related software, the students produce their own cartoon and an animated sequence. They use a digital-video movie camera to capture a picture and create an animated project. Students also explore video graphic design.

### **Computer Technology**

In the *Computer Technology* Module, students explore the basic components of a computer and perform routine maintenance on a computer system. They also explore the use of a Windows operating system and add, remove, and test various computer components. Students work with parts inside the PC housing, such as expansion cards and memory modules. They install and explore uses for peripheral items such as monitors, a keyboard, a mouse, and a printer.

### **Confident Consumer**

In the *Confident Consumer* Module, students use problem-solving techniques to complete activities related to consumer education. Students calculate unit prices, evaluate sales and discounts provided by vendors, calculate the most economical way to purchase food and drinks for a party of 25, evaluate products based on strength and absorbency, and much more. Percents, ratios, and proportions are used extensively throughout this module.

### **Creative Solutions**

In the *Creative Solutions* Module, students are confronted with problems to solve. They assemble models to solve problems and learn to develop problem-solving strategies as well as time management skills while increasing self-confidence. Challenges are given to solve problems using models constructed from building sets. Ultimately, students use their skills to design a compound machine to meet a challenge.

### **Digital Design**

In the *Digital Design* Module, students are introduced to the principles of design that lead to effective visual communication. This Module also addresses the process involved when creating a layout. Students learn how correct usage of the various elements leaves the reader with a clear understanding of the intended message. The psychology used with design and layout is explained, including the optical center, the "eye catcher," and eye movement through the material and off the piece.

### **Digital Transportation**

In the *Digital Transportation* Module, students learn that transportation is the movement of people and goods. They see a brief history and a time line of transportation that shows walking all the way to space travel. This includes transportation on land and water and through air (atmosphere) and space. Students experience the latest technologies that impact transportation through the use of digital map reading, locating software, and a Global Positioning System (GPS).

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### **Digital Video**

In the *Digital Video* Module, students enter the world of digital editing and step into the creative role of editor. After being introduced to the preproduction phases of video, they learn the importance of computer power in the digital editing process. Students are exposed to elements that include good editing principles as well as special effects and manipulation of data, both audio as well as video.

### **Dynamic Earth**

In the *Dynamic Earth* Module, students gain a scientific understanding of the processes that shape our dynamic earth. Students identify minerals and rocks, construct models, calculate the epicenter of an earthquake, create and read a topographic map, and defend a position by demonstrating an understanding of history, facts, and beliefs.

### **Early Childhood**

In the *Early Childhood* Module, students explore the physical, intellectual, social, and emotional development of children from birth to age eight. Students research a wide variety of activities and meals identified as age appropriate for children. Finally, they examine career opportunities within the field of early childhood development.

### **Ecology**

In the *Ecology* Module, students explore the interdependence of organisms (including humans) and the non-living environment. They consider biotic and abiotic factors and energy flow through food webs; nutrient cycles; population interactions, including population growth, carrying capacity, and predator-prey interactions; biodiversity; and humans as part of ecological systems.

### **Electricity**

In the *Electricity* Module, students learn the principles of electricity and draw schematics of both parallel and series circuits. Students wire a series and a parallel circuit and classify conductors and insulators. They use a volt-ohm meter as well as identify the magnetic fields important to the concept of electricity. Students also measure voltage, resistance, and current during the Module activities.

### **Electronics**

In the *Electronics* Module, students learn the common components of basic circuits in electronic devices. They also complete various electronic experiments using an educational instrument. The construction of a simple electronics kit helps them learn the application of each component used to make the project successfully function.

### **Energy, Power & Mechanics**

When students complete the *Energy, Power & Mechanics* Module, they will have a basic understanding of energy sources, the principles of power technology, and the concept of mechanical advantage and machines. Students see how fluids can be used with other simple machines. Using Synergistic educational instruments, students learn the fundamentals of gears, fluid mechanics, and three classes of levers. They also use a hot dog cooker and experience the concept of wind power.

### **Engineering Bridges**

In the *Engineering Bridges* Module, students solve an engineering problem as a team. Their task is to build a balsa wood bridge that spans a space and holds the most weight before breaking. There are certain rules that the students must follow to build their bridges correctly. Students learn the relationships among design, structure, and strength of a bridge. By building a bridge and testing its strength on a structure tester, students learn valuable engineering concepts and principles.

### **Engineering Towers**

Students utilize math, physics, and problem-solving skills in the *Engineering Towers* Module. They are given this challenge: build a tower that holds more weight than the towers built by their classmates. Designing, building, and testing a tower is the activity base in this Module. Using engineering skills and video segments, students learn the skills necessary to facilitate construction and evaluation of a tower.

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### **Engines**

In the *Engines* Module, students are introduced to the history, theory, and applications of engines. They learn shop and equipment safety, basic operating principles, parts, and tools – all through practical hands-on experience with a common four-stroke motor.

### **Entrepreneurship: Child Care**

In the *Entrepreneurship: Child Care* Module, students explore the basics of the business of babysitting and child care. They learn how to find a job and what their employers might expect of them. Students also examine important aspects of child care, such as first aid, safety, and activities that are geared for the child's development stage. Throughout the Module, students build a portfolio that will be invaluable to them, whether they are beginning or experienced sitters.

### **Environmental Issues**

In the *Environmental Issues* Module, students use multimedia and hands-on activities and experiments to explore pollution, loss of habitats and biodiversity, resource use, waste management, global climate change, and human population growth. They learn statistics relating to these issues; do activities relating to acid rain, paper recycling, and the greenhouse effect; and develop a plan to address a given environmental problem.

### **Families**

In the *Families* Module, students explore different aspects of family life by creating an Internet Web site concerning various family topics. The topics covered in this presentation include family types, the family life cycle, family relationships, functions of the family, and healthy family characteristics. Students use a computer software program to create a presentation that shows healthy family lifestyles.

### **Farm Management**

In the *Farm Management* Module, students learn basic business management concepts and develop an understanding of the various management decisions involved in a sustainable farm operation. Students acquire knowledge and proficiency in applying economic principles and business management analysis concepts to various farm and ranch operations. Students get hands-on management experience with a vermiculture operation.

### **Fashion & Textiles**

In the *Fashion & Textiles* Module, students explore the fabric and apparel industry. They learn about textiles, from the creation of fibers and the design of fabrics to the merchandising of the finished products. Students learn how each element of design can affect the way a person looks and make apparel decisions based upon this information. They also explore wholesale buying and merchandising, creating a retail merchandising layout.

### **Fitness & Health**

In the *Fitness & Health* Module, students explore the basics of personal fitness and learn how to keep their bodies fit both inside and outside. They begin by analyzing their own fitness level. Students learn ways to measure and improve cardiovascular and muscular fitness. They learn the basics of proper nutrition, and the proper care of hair, skin, and teeth. Finally, based on what they have learned, they develop a plan to improve and maintain their own fitness.

### **Flight**

In the *Flight* Module, students learn the principles of flight. They use a computer flight simulator to experience piloting an aircraft. Each student evaluates the other and prepares a written critique of his or her partner's flight. Students are introduced to navigation and they plot a course using angular measurement and mathematical computation.

### **Food Science**

In the *Food Science* Module, students examine the six main nutrients. They conduct experiments demonstrating food science concepts. Students use laboratory equipment including an electronic balance, graduated cylinders, test tubes, and beakers. They also write a separate laboratory report for each experiment conducted during the course of the Module.

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### **Forces**

In the *Forces* Module, students explore forces and how they affect the motion of objects. Students learn to describe and measure the motion of objects by completing distance, time, speed, velocity, and measurement activities. Using examples they already find relevant, students learn about various forces. They describe and measure the changing motion of accelerating objects and observe the direction of motion and how radius affects centripetal acceleration.

### **Forensic Science**

In the *Forensic Science* Module, students determine the prime suspect in a fictitious vandalism of a local high school. Students analyze evidence, which includes fingerprints, hair samples, handwriting, and writing samples. Students also extract DNA from a sample. Students compare the evidence with samples taken from suspects. Finally they must put all the evidence together and identify a prime suspect. Teachers may customize suspect samples and evidence, just to keep it interesting!

### **Genetics**

In the *Genetics* Module, students learn genetics terminology and simulate breeding experiments similar to Mendel's. They construct models of chromosomes and DNA. Students create Punnett squares and determine probabilities of offspring given specific parent genotypes. They complete a dihybrid cross and a natural selection experiment.

### **Graphic Communications**

In the *Graphic Communications* Module, students learn the fundamentals of drafting and communication of technical information. They also learn to use the related tools (drawing board, scale, triangles, and T square) needed to complete various drawings such as orthographic projections. Design and measurement skills are also emphasized. The skills introduced in this Module will assist students throughout their lives.

### **Gravity**

In the *Gravity* Module, students explore the velocity of falling objects using a picket fence and a timer. Students create a "velocity versus time" graph and determine the acceleration of gravity. Students use an air track to perform experiments related to potential and kinetic energy. They use a photogate and computer software to explore velocity and acceleration of falling objects, and they gather, graph, analyze, interpret, and apply experimental data.

### **Heart Fitness**

In the *Heart Fitness* Module, students cover factors affecting heart fitness, particularly diet and exercise. They monitor and record blood pressure and heart rate, identify heart structures, and describe the path of blood through the circulatory system. They monitor their own diet and relate it to heart fitness. They study symptoms of cardiovascular disease and learn the relationship of diet, lack of physical activity, and smoking on development of cardiovascular disease.

### **Heat & Energy**

In the *Heat & Energy* Module, students learn definitions of concepts related to heat and energy including temperature, potential and kinetic energy, and work. They look at heat and energy from the molecular viewpoint as they construct models of simple hydrocarbon fuels. Students learn the chemical reaction involved in combustion and the components necessary for combustion to occur and distinguish examples of exothermic and endothermic reactions.

### **Horticulture**

In the *Horticulture* Module, students briefly explore important subfields of horticulture and then delve into the processes of growing and maintaining their own plants, including germinating plants, making cuttings, and growing plants in both soil and hydroponics media. They explore plant classification, structure, and reproduction. They are introduced to the forestry industry, tree identification, and ecology and conservation concerns in horticulture and forestry.

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### **Immune System**

In the *Immune System* Module, students explore the role of the immune system in preventing and fighting disease and survey the history of disease prevention. They learn proper techniques for handling microbes and conduct experiments on microbial diversity and on the action of antibiotics. They learn the various components of the immune system, including external defenses, the lymphatic system, white blood cells, and antigen-antibody reactions.

### **Interior Design**

In the *Interior Design* Module, students study many concepts that today's interior decorator utilizes on a daily basis. They explore the principles of design from interior design to color coordination, floor plans, home furnishings, and budgets for remodeling. Students learn about the relationships between material costs and personal choices by creating a cost proposal for a remodeling project.

### **Life Skills**

In the *Life Skills* Module, students complete a personal assessment and create a presentation on four of the primary issues facing teens. They rely on research and personal experience as their sources of information for this presentation. The presentation is directed at their peers and adults to help them better understand and cope with these issues. Students are given the chance to consider, research, and provide advice on issues related to stress, peer pressure, self-esteem, and relationships.

### **Light & Lasers**

In the *Light & Lasers* Module, students explore aspects of light and lasers and see how technology can be used. Students use geometric concepts to divide and reflect a laser beam along a path and to create a security system utilizing the beam. Light is explored and manipulated through experiments that use lenses, prisms, filters, and intensity meters. The data from these experiments is analyzed and interpreted to provide a clear picture of the nature of light.

### **Logic & Reasoning**

In the *Logic & Reasoning* Module, students explore problem solving by using various manipulatives. They use cards to simulate lockers, use dice to create data to analyze, and use an abacus to add and subtract using patterns. Students create shapes on geoboards and learn about mathematicians who solved problems. They study patterns and sequences and try their skills at completing wooden puzzles and analogies.

### **Material Science**

In the *Material Science* Module, students explore the basic structure and properties of various materials through hands-on activities and experiments. They conduct experiments to test the conductivity of materials and the difference between insulators and conductors of electricity. Students use an atom-building gameboard to construct a specific atom. The data from these experiments and activities in this Module will aid the students in understanding the materials around them in day-to-day living.

### **Microbiology**

In the *Microbiology* Module, students will learn the five-kingdom classification system and the characteristics of bacteria, protists, and fungi. They will culture and identify bacterial colonies and observe living protists and fungi. They will distinguish between simple prokaryotic and more complex eukaryotic cells. They will learn microscope use, measure microscopic organisms, and calculate actual sizes of microorganisms based on their magnification.

### **Microwave Cooking & Nutrition**

In the *Microwave Cooking & Nutrition* Module, students explore the correct and proper usage of the microwave oven. Students learn the advantages of microwave cooking versus conventional cooking and also prepare several recipes. After preparing the recipes, students use a software program to evaluate the nutritional value of these foods.

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### **Music & Sound**

Frequency, pitch, waves, amplitude, Fibonacci numbers, and ratios are concepts covered in the *Music & Sound* Module. Students learn music history and explore the creation of music. They investigate the science and math behind the components of sound and are introduced to music theory. Students apply their skills to create rhythms on an electric drum pad and melodies on an electric keyboard. Students utilize software to record their melodies.

### **Natural Disasters**

The Natural Disasters Module illustrates important Earth Science principles in the context of various types of natural disasters. Students will spend one session each on earthquakes, volcanoes, floods and tsunamis, hurricanes, tornadoes, and weather extremes. They will learn Earth processes that cause each disaster, detection and tracking methods, and types of damage. As a wrap-up, they will consider risks and probabilities and develop their own disaster plan.

### **Oceanography**

In the *Oceanography* Module, students locate oceans and explore the topography of the ocean floor. They do several experiments and activities to understand salinity, density, conductivity, and pressure changes in the oceans and to explore the actions of waves and currents. Students survey the organisms found in several ocean habitats and consider the ways in which humans use and abuse the oceans. They do several types of mathematical calculations related to ocean properties.

### **Organism Reproduction**

During the course of the *Organism Reproduction* Module, students learn how different organisms reproduce, starting with the simplest of all organisms, bacteria, and ending with the most complex organisms, humans. Students explore asexual and sexual reproduction processes involving organisms from each of the five Kingdoms. Students investigate both the mitosis and meiosis processes. Students research inherited diseases caused by abnormal genes.

### **Package Design**

In the *Package Design* Module, students design and construct a package for a specified product. They explore spatial relationships as well as transformations and use rotations, reflections, and translations to create tessellations used as graphics for packages. Students select the package's shape based on appearance and practicality and design packages to conserve as much material and space as possible. Students also explore how transformations are used in art.

### **Personal Finance**

In the *Personal Finance* Module, students explore several different aspects of money management – from opening a checking account to building savings for the future. They see the effects that compound and simple interest can have on savings and debt. Furthermore, they develop a budget and explore how choices about their lifestyles can affect the types of careers they choose. The goal is for wise financial decisions made in the module to be repeated in real life.

### **Plants & Pollination**

In the *Plants & Pollination* Module, students fit plants into the five- and six-kingdom classification systems and learn the importance of plants on Earth. They are introduced to the structure and function of plant cells and tissues. They learn the functions of roots, stems, and leaves; and they cover plant processes including photosynthesis, respiration, and transpiration. They also look at plant pollination and reproduction and the difference between monocots and dicots.

### **Plastics & Polymers**

In the *Plastics & Polymers* Module, students explore several types of polymers, including plastics. Students explore the basic concepts of atoms, molecules, and compounds. This enables students to better understand the properties of the plastics and polymers they create and manipulate. Students create, mold, recycle, and form various polymers. These activities provide a better understanding of the usefulness and limitations of the materials.

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### **Practical Skills**

In the *Practical Skills* Module, students learn to identify common tools and their uses. They will be introduced to the history of measuring systems, repair faulty systems, and follow directions to assemble prefabricated furniture. One important skill taught is to recognize situations when it would be best to call in a professional to help them solve the problem.

### **Reactions**

In the *Reactions* Module, students experience and perform chemical processes that contribute to their general understanding of basic chemical principles, the reasoning for classifying reactants and products into specific groups, and the methods involved for mathematically interpreting the results. Practical, familiar examples of chemical reactions are used throughout this Module to enhance the student's realization of the importance of chemistry.

### **Research & Design**

In the *Research & Design* Module, students design, manufacture, and race a model CO<sub>2</sub>-powered dragster car. Students design their car to meet certain specifications and limitations so that it qualifies as a legal car on race day. They learn the concepts and terms in the design process as well as gain an understanding of lift and drag on an object. After they finish their car, students test it in several ways and predict its performance.

### **Research & Presentation**

In the *Research & Presentation* Module, students locate, evaluate, and document resources, including books, CD-ROM encyclopedias, and Web sites. They are shown how to take notes and avoid plagiarism in their work. Using Microsoft *PowerPoint* software, students create and deliver a multimedia slide presentation based on their research. Students are also exposed to guidelines for effectively delivering a presentation and communicating with an audience.

### **Robots**

In the *Robots* Module, students learn about the fascinating role that robots play in their lives. More and more, this technology is helping to improve the way we live and manufacture items. Students learn how to operate, program, and use robots in different environments. Initially, each student learns to manipulate the robot and program it to conduct repeatable tasks. Ultimately, they operate a robot located in a remote location away from direct view via a televised image of the work task.

### **Rocket Science**

In the *Rocket Science* Module, students learn about the scientific principles of flight, propulsion, and aerodynamics. Newton's laws of motion are introduced and explained in practical terms. The history of rocket science is an important concept in understanding the development of rockets and is presented during this Module. Students construct a water-fueled Stratoblaster® rocket and launch it as a culminating activity.

### **Rocketry & Space**

In the *Rocketry & Space* Module, students learn about the development of rocketry and the United States space program and its history. Learning the principles of rocket design, propulsion, and certain scientific principles that are fundamental to successful rocket flight are important concepts in this Module. Students construct and launch a model rocket as a means of applying the scientific concepts presented.

### **Sewing & Design**

In the *Sewing & Design* Module, students create a trapillow, a pillow on which a three-dimensional design has been quilted. They use a hand stitch to quilt the design and then use a sewing machine to assemble their pillows. At the conclusion of the project, students gain experience hand stitching and using a sewing machine and have a completed pillow to take home. In addition, students use computer software to create their own project design.

### **Simple Machines**

In the *Simple Machines* Module, students explore how work, force, energy, and machines make moving objects easier through the use of the computer and hands-on activities. They use variables and equations to describe the principles of simple machines. Students use the information they learn about simple machines to design a compound machine that moves an object.

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### **Snack Nutrition**

In the *Snack Nutrition* Module, students prepare, serve, and eat several delicious snacks. They use computer software to evaluate the nutritional value of each of the snacks and to calculate how much of their recommended dietary allowance of each nutrient is in each snack. Students identify a diet that is high in fat and its relationship to coronary artery disease and health problems.

### **Soils**

In the *Soils* Module, students explore the role soil plays in agriculture and in our survival as a species on this planet. Students learn about soil formation, soil chemistry, and sustainable agricultural practices used to conserve, as well as increase, the productivity of soil. They participate in experiments that determine the characteristics of an agriculturally productive soil and show the importance of the relationship among soil, water, air and living organisms.

### **Statistical Analysis**

While engaged in the *Statistical Analysis* Module, students will create and conduct a survey and graph their data. Students explore histograms, box plots, stem-and-leaf plots, bar graphs, pie graphs, and line graphs and use them to display statistical information. Students also complete probability activities ranging from tossing two-colored chips and rolling dice to generating and using Pascal's Triangle to calculate experimental and theoretical probabilities. Students also use their knowledge of probability to create a fair game.

### **Video Production**

In the *Video Production* Module, students learn many facets of video production and communication. Students explore the working of a video camera, the editing process, and Federal Communications Commission regulations. They organize ideas, write scripts, outline a storyboard, shoot video, and edit their video productions. Students also study the effect of media in their own lives and use this information to produce a persuasive public service announcement.

### **Water Management**

In the *Water Management* Module, students explore the hydrologic cycle, the uses of water, types of water pollution, and the design and function of water treatment plants. They use a River Tank to estimate surface area and volume of water in a water body and to calculate flow rate. They use a watershed model to simulate runoff, groundwater activity, and pollution. They also calculate a water budget for a family and consider methods of water conservation.

### **Weather**

The *Weather* Module begins from a global perspective by including circulation and weather patterns and moves to local weather system investigation. Students see the relevance of this Module daily as their local weather changes. They learn how their local weather is predicted, or forecast, on the news and how weather patterns of a global nature can influence their everyday lives. Students also keep daily recordings of weather data such as temperature, pressure, and wind direction.

### **Webmaster**

While in the *Webmaster* Module, students explore the role of a Webmaster, or Internet Web site manager. Ultimately, they are responsible for planning, designing, developing, and maintaining an Internet Web site on a chosen topic worthy of being published to the World Wide Web.

### **Weights & Measures**

In the *Weights & Measures* Module, students use process skills as tools of scientific inquiry. They begin by learning to make observations and then classify objects. As the activities progress, students complete hands-on projects representing each logical step of the scientific method. They learn to formulate a hypothesis and must cooperate with their partner in the development of an experiment to test the hypothesis. This Module can be termed a "scientific experience."